[0087] The various illustrations of the methods and apparatuses herein are intended to provide a general understanding of the structure of various embodiments and are not intended to provide a complete description of all the elements and features of the apparatuses and methods that might make use of the structures, features, and materials described herein.

[0088] The apparatuses of the various embodiments may include or be included in, for example, electronic circuitry used in high-speed computers, communication and signal processing circuitry, single or multi-processor modules, single or multiple embedded processors, multi-core processors, data switches, and application-specific modules including multilayer, multi-chip modules, or the like. Such apparatuses may further be included as sub-components within a variety of electronic systems, such as televisions, cellular telephones, personal computers (e.g., laptop computers, desktop computers, handheld computers, tablet computers, etc.), workstations, radios, video players, audio players, vehicles, medical devices (e.g., heart monitors, blood pressure monitors, etc.), set top boxes, and various other electronic systems.

[0089] A person of ordinary skill in the art will appreciate that, for this and other methods (e.g., programming or read operations) disclosed herein, the activities forming part of various methods may be implemented in a differing order, as well as repeated, executed simultaneously, or substituted one for another. Further, the outlined acts and operations are only provided as examples, and some of the acts and operations may be optional, combined into fewer acts and operations, or expanded into additional acts and operations without detracting from the essence of the disclosed embodiments.

[0090] The present disclosure is therefore not to be limited in terms of the particular embodiments described in this application, which are intended as illustrations of various aspects. Many modifications and variations can be made, as will be apparent to a person of ordinary skill in the art upon reading and understanding the disclosure. Functionally equivalent methods and apparatuses within the scope of the disclosure, in addition to those enumerated herein, will be apparent to a person of ordinary skill in the art from the foregoing descriptions. Portions and features of some embodiments may be included in, or substituted for, those of others. Many other embodiments will be apparent to those of ordinary skill in the art upon reading and understanding the description provided herein. Such modifications and variations are intended to fall within a scope of the appended claims. The present disclosure is to be limited only by the terms of the appended claims, along with the full scope of equivalents to which such claims are entitled. It is also to be understood that the terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting.

[0091] The Abstract of the Disclosure is provided to comply with 37 C.F.R. §1.72(b), requiring an abstract allowing the reader to quickly ascertain the nature of the technical disclosure. The abstract is submitted with the understanding that it will not be used to interpret or limit the claims. In addition, in the foregoing Detailed Description, it may be seen that various features are grouped together in a single embodiment for the purpose of streamlining the disclosure. This method of disclosure is not to be interpreted as limiting the claims. Thus, the following claims are hereby incorporated into the Detailed Description, with each claim standing on its own as a separate embodiment.

1. A method comprising applying a programming pulse, having an attribute configured to emulate a determined memory function type, to one or more selected ones of a plurality of resistance change memory (RCM) cells, the attribute comprising an integration of at least one pulse amplitude having a pulse time duration associated with the determined memory function type.

2. The method of claim **1**, further comprising selecting the determined memory function type to be at least one type of memory selectable from memory types including volatile memory, storage class memory, and one-time programmable memory.

3. The method of claim **1**, further comprising reallocating sections of the memory to or from storage of digital information from or to storage of analog information, respectively.

4. The method of claim **1**, further comprising applying a voltage-ramp to provide a voltage amplitude of the programming pulse.

5. The method of claim **1**, further comprising selecting an energy level for each of the one or more selected ones of the plurality of RCM cells to be provided in the programming pulse to emulate the determined memory function type.

6. The method of claim **5**, wherein the selected energy level corresponds to a state of a localized conduction region within each of the one or more selected ones of the plurality of RCM cells.

7. The method of claim **5**, wherein selecting the energy level for each of the one or more selected ones of the plurality of RCM cells comprises selecting the pulse time duration of the programming pulse.

8. The method of claim **5**, wherein selecting the energy level for each of the one or more selected ones of the plurality of RCM cells comprises selecting the pulse amplitude of the programming pulse.

9. The method of claim **5**, wherein selecting the energy level comprises selecting a current delivered to each of the one or more selected ones of the plurality of RCM cells over the pulse time duration of the programming pulse.

10. The method of claim **1**, further comprising varying an amount of power consumed to program each of the one or more selected ones of the plurality of RCM cells depending upon a determined retention period of the memory cell, the amount of power to control both a height parameter and a radial growth parameter of a localized conduction region of the RCM cell.

11. An apparatus, comprising:

a plurality of resistance change memory (RCM) cells; and

drive circuitry electrically coupled to the plurality of RCM cells to provide a signal pulse, the signal pulse having an attribute configured to emulate a determined memory function type, to one or more selected ones of a plurality of the RCM cells.

12. The apparatus of claim **11**, wherein the signal pulse is configurable in both amplitude and time duration to vary a data retention time of the plurality of RCM cells.

13. The apparatus of claim **11**, wherein the attribute further comprises an integration of at least one pulse amplitude having a pulse time duration associated with the determined memory function type.

14. The apparatus of claim **11**, wherein each of the plurality of RCM cells includes a material that can be